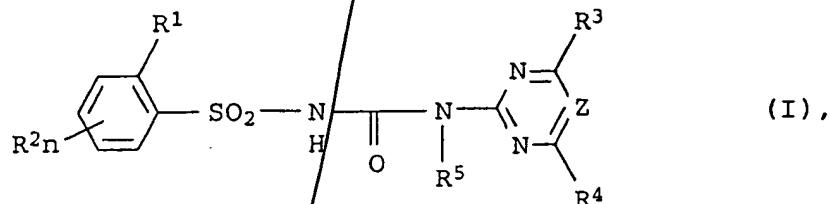


We claim:

1. A herbicidal mixture comprising

a) at least one derivative of a sulfonylurea of the formula
I



where the substituents have the following meanings:

R¹ is C₁-C₆-alkyl which has attached to it one to five of the following groups: methoxy, ethoxy, SO₂CH₃, cyano, chlorine, fluorine, SCH₃, S(O)CH₃;

halogen;

a group ER⁶ where E is O, S or NR⁷;

COOR⁸;

NO₂;

S(O)₀R⁹, SO₂NR¹⁰R¹¹, CONR¹⁰R¹¹;

R² is hydrogen, C₁-C₄-alkyl, C₂-C₄-alkenyl, C₂-C₄-alkynyl, halogen, C₁-C₄-alkoxy, C₁-C₄-haloalkoxy; C₁-C₄-haloalkyl, a C₁-C₂-alkylsulfonyl group, nitro, cyano or C₁-C₄-alkylthio;

R³ is F, CF₃, CF₂Cl, CF₂H, OCF₃, OCF₂Cl, or, if R¹ is CO₂CH₃ and R² is simultaneously fluorine, R³ is Cl, or, if R¹ is CH₂CF₃ or CF₂CF₃, R³ is methyl, or, if R⁴ is OCF₃ or OCF₂Cl, R³ is OCF₂H or OCF₂Br;

R⁴ is C₁-C₂-alkoxy, C₁-C₂-alkyl, C₁-C₂-alkylthio, C₁-C₂-alkylamino, di-C₁-C₂-alkylamino, halogen, C₁-C₂-haloalkyl, C₁-C₂-haloalkoxy,

- 5 R⁵ is hydrogen, C₁-C₂-alkoxy, C₁-C₄-alkyl;
- 10 R⁶ is C₁-C₄-alkyl, C₂-C₄-alkenyl, C₂-C₄-alkynyl or C₃-C₆-cycloalkyl, all of which can have attached to them 1 to 5 halogen atoms, with the exception of allyl, difluoromethoxy, chlorodifluoromethoxy and 2-chloroethoxy, if E is O or S. In the event that E is O or NR⁷, R⁶ is furthermore also methylsulfonyl, ethylsulfonyl, trifluoromethylsulfonyl, allyl-sulfonyl, propargylsulfonyl or dimethylsulfamoyl;
- 15 R⁷ is hydrogen, methyl or ethyl
- 20 R⁸ is a C₁-C₆-alkyl group which can have attached to it up to three of the following radicals: halogen, C₁-C₄-alkoxy, C₁-C₄-alkylthio, C₁-C₄-haloalkoxy, C₁-C₄-alkoxy-C₁-C₂-alkoxy, C₃-C₇-cycloalkyl and/or phenyl; a C₅-C₇-cycloalkyl group which can have attached to it up to three C₁-C₄-alkyl groups; C₃-C₆-alkenyl or C₃-C₆-alkynyl;
- 25 R⁹ is a C₁-C₆-alkyl group which can have attached to it one to three of the following radicals: halogen, C₁-C₄-alkoxy, C₁-C₄-alkylthio, C₁-C₄-haloalkoxy, C₁-C₄-alkoxy-C₁-C₂-alkoxy, C₃-C₇-cycloalkyl and/or phenyl; a C₅-C₇-cycloalkyl group which can have attached to it one to three C₁-C₄-alkyl groups; C₃-C₆-alkenyl or C₃-C₆-alkynyl;
- 30 R¹⁰ is hydrogen, C₁-C₂-alkoxy, C₁-C₆-alkyl, or together with R¹¹ is a C₄-C₆-alkylene chain in which one methylene group can be replaced by an oxygen atom or a C₁-C₄-alkylimino group;
- 35 R¹¹ is a C₁-C₄-alkyl group which can have attached to it one to four halogen or C₁-C₄-alkoxy radicals; C₃-C₆-cycloalkyl
- 40 n is 0 - 3
- o is 1 - 2
- 45 Z N or CH,
- or their environmentally compatible salts

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and

- b) a synergistically active amount of at least one herbicidal compound selected from groups b1 to b41

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b1 1,3,4-thiadiazoles:
buthidazole, cyprazole

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b2 amides:
allidochlor (CDAA), benzoylprop-ethyl, bromobutide,
chlorthiamid, dimepiperate, dimethenamid, diphenamid,
etobenzanid (benzchlomet), flamprop-methyl, fosamin,
isoxaben, monalide, naptalame, pronamid (propyzamid),
propanil

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b3 aminophosphoric acids:
bilanafos, (bialaphos), buminafos, glufosinate-
ammonium, glyphosate, sulfosate

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b4 aminotriazoles:
amitrol

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b5 anilides:
anilofos, mefenacet

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b6 aryloxyalkanoic acids:
2,4-D, 2,4-DB, clomeprop, dichlorprop, dichlorprop-P,
dichlorprop-P (2,4-DP-P), fenoprop (2,4,5-TP),
fluoroxypyr, MCPA, MCPB, mecoprop, mecoprop-P,
napropamide, napropanilide, triclopyr

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b7 benzoic acids:
chloramben, dicamba

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b8 benzothiadiazinones:
bentazone

b9 bleaches:
clomazone (dimethazone), diflufenican, fluoro-
chloridone, flupoxam, fluridone, pyrazolate,
sulcotrione (chlormesulone)

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b10 carbamates:
asulam, barban, butylate, carbetamid, chlorbufam,
chlorpropham, cycloate, desmedipham, di-allate,
EPTC, esprocarb, molinate, orbencarb, pebulate,
phenisopham, phenmedipham, propham, prosulfocarb,

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pyributicarb, sulf-allate (CDEC), terbucarb, thioben-
carb (benthiocarb), tiocarbazil, tri-allate, verno-
late

5 b11 quinolinecarboxylic acids:
quinclorac, quinmerac

10 b12 chloracetanilides:
acetochlor, alachlor, butachlor, butenachlor,
diethatyl-ethyl, dimethachlor, metazachlor,
metolachlor, pretilachlor, propachlor, prynachlor,
terbuchlor, thenylchlor, xylachlor

15 b13 cyclohexenones:
alloxydim, caloxydim, clethodim, cloproxydim,
cycloxydim, sethoxydim, tralkoxydim, 2-{1-[2-(4-
chlorophenoxy)propyloxyimino]butyl}-3-hydroxy-5-(2H-
tetrahydrothiopyran-3-yl)-2-cyclohexen-1-one

20 b14 dichlorpropionic acids:
dalapon

25 b15 dihydrobenzofurans:
ethofumesate

b16 dihydrofuran-3-ones:
flurtamone

30 b17 dinitroanilines:
benefin, butralin, dinitramin, ethalfluralin,
fluchloralin, isopropalin, nitralin, oryzalin,
pendimethalin, prodiamine, profluralin, trifluralin

35 b18 dinitrophenols:
bromofenoxim, dinoseb, dinoseb-acetat, dinoterb, DNOC

40 b19 diphenyl ethers:
acifluorfen-sodium, aclonifen, bifenox, chlornitrofen
(CNP), difenoxuron, ethoxyfen, fluorodifen, fluoro-
glycofen-ethyl, fomesafen, furyloxyfen, lactofen,
nitrofen, nitrofluorfen, oxyfluorfen

45 b20 dipyridylenes:
cyperquat, difenzoquat methylsulfate, diquat, para-
quat dichloride

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b21 ureas:

benzthiazuron, buturon, chlorbromuron, chloroxuron,
chlortoluron, cumyluron, dibenzyluron, cycluron,
dimefuron, diuron, dymrone, ethidimuron, fenuron,
fluometuron, isoproturon, isouron, karbutilate,
linuron, methabenzthiazuron, metobenzuron, metoxuron,
monolinuron, monuron, neburon, siduron, tebuthiuron,
trimeturon

b22 imidazoles:

isocarbamid

b23 imidazolinones:

imazamethapyr, imazapyr, imazaquin, imazethabenz-
methyl (imazame), imazethapyr

b24 oxadiazoles:

methazole, oxadiargyl, oxadiazon

b25 oxiranes:

tridiphane

b26 phenols:

bromoxynil, ioxynil

b27 phenoxyphenoxypropionic esters:

clodinafop, cyhalofop-butyl, diclofop-methyl,
fenoxaprop-ethyl, fenoxaprop-P-ethyl, fenthiafop-
ethyl, fluazifop-butyl, fluazifop-P-butyl, haloxyfop-
ethoxyethyl, haloxyfop-methyl, haloxyfop-P-methyl,
isoxapyrifop, propaquizafop, quizalofop-ethyl,
quizalofop-P-ethyl, quizalofop-tefuryl

b28 phenylacetic acids:

chlorfenac (fenac)

b29 phenylpropionic acid:

chlorophenprop-methyl

b30 protoporphyrinogen IX oxydase inhibitors:

benzofenap, cinidon-ethyl, flumiclorac-pentyl,
flumioxazin, flumipropyn, flupropacil, fluthiacet-
methyl, pyrazoxyfen, sulfentrazone, thidiazimin

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- b31 pyrazoles:
nipyraclufen
- 5 b32 pyridazines:
chloridazon, maleic hydrazide, norflurazon, pyridate
- b33 pyridinecarboxylic acids:
clopyralid, dithiopyr, picloram, thiazopyr
- 10 b34 pyrimidyl ethers:
pyrithiobac acid, pyrithiobac sodium, KIH-2023,
KIH-6127
- 15 b35 sulfonamides:
flumetsulam, metosulam
- 20 b36 sulfonylureas:
amidosulfuron, azimsulfuron, bensulfuron-methyl,
chlorimuron-ethyl, chlorsulfuron, cinosulfuron,
cyclosulfamuron, ethametsulfuron-methyl, ethoxy-
sulfuron, flazasulfuron, halosulfuron-methyl, imazo-
sulfuron, metsulfuron-methyl, nicosulfuron, primi-
sulfuron, prosulfuron, pyrazosulfuron-ethyl, rim-
sulfuron, sulfometuron-methyl, thifensulfuron-methyl,
25 triasulfuron, tribenuron-methyl, triflusulfuron-
methyl
- 30 b37 triazines:
ametryn, atrazine, aziprotryn, cyanazine, cyprazine,
desmetryn, dimethamethryn, dipropetryn, eglinazine-
ethyl, hexazinon, procyazine, prometon, prometryn,
propazine, secbumeton, simazine, simetryn, terbume-
ton, terbutryn, terbuthylazine, trietazine
- 35 b38 triazinones:
ethiozin, metamitron, metribuzin
- b39 triazolecarboxamides:
triazofenamid
- 40 b40 uracils:
bromacil, lenacil, terbacil
- 45 b41 others:
benazolin, benfuresate, bensulide, benzofluor,
butamifos, cafenstrole, chlorthal-dimethyl (DCPA),

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2. A herbicidal mixture as claimed in claim 1, comprising a sulfonylurea of the formula I where

R¹ is CO₂CH₃, CO₂C₂H₅, CO₂iC₃H₇, CF₃, CF₂H, CH₂CF₃, CF₂CF₃, OSO₂CH₃, OSO₂N(CH₃)₂, Cl, NO₂, SO₂N(CH₃)₂, SO₂CH₃, SO₂C₂H₅ and N(CH₃)SO₂CH₃,

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~~R³ is CF₂H, OCF₃, OCF₂Cl, CF₃, or, if R¹ is CO₂CH₃ and R² is simultaneously fluorine, R³ is Cl, or, if R¹ is F₃, CH₂CF₃ or CF₂CF₃, R³ is methyl,~~

R^4 is OCH_3 ,

R⁵ is hydrogen and

Z is N or CH.

25 3. A herbicidal mixture as claimed in claim 1 or 2, comprising a
sulfonylurea of the formula I where

R¹ is halogen, a /group ER⁶, a group CO₂R⁸, SO₂CH₃ or SO₂C₂H₅.

R^2 is hydrogen,

 R^3 is F .

R^4 is OCF_3 , OCF_2Cl , OCH_3 ,

R^5 is hydrogen,

R⁶ and R⁸ have the meanings given in claim 1 and

Z is N or CH.

4. A herbicidal mixture as claimed in any of claims 1 to 3, comprising a sulfonylurea of the formula I where

R^1 is CF_3 .

R² is hydrogen,

R³ is CF₃,

5 R⁴ is OCH₃,

R⁵ is hydrogen and

Z is N.

- 10 5. A herbicidal mixture as claimed in any of claims 1 to 4, comprising at least one herbicidal compound (b) from the group consisting of
- 15 bromobutide, dimethenamid, isoxaben, propanil, glufosinate-ammonium, glyphosate, sulfosate, mefenacet, 2,4-D, 2,4-DB, 2,4-DBEE, dichlorprop, dichlorprop-p (2,4-DP-P), fluroxypyr, MCPA, mecoprop, mecoprop-p, dicamba, bentazone, clomazone, diflufenican, sulcotrione, phenmedipham, thiobencarb, quinclorac, quinmerac, acetochlor,
- 20 alachlor, butachlor, metazachlor, metolachlor, pretilachlor, butoxydim, clethodim, cycloxydim, sethoxydim, tralkoxydim, caloxydim, 2-{1-[2-(4-chlorophenoxy)propyloxyimino]butyl}-3-hydroxy-5-(2H-tetrahydrothiopyran-3-yl)-2-cyclohexen-1-one,
- 25 pendimethalin, acifluorfen-sodium, bifenox, fluoroglycofen-ethyl, fomesafen, lactofen, chlortoluron, cycluron, dymrone, isoproturon, methabenzthiazuron, imazaquin, imazethabenzmethyl, imazethapyr, bromoxynil, ioxynil, clodinafop, cyhalofop-butyl, fenoxypyr-ethyl, fenoxaprop-p-ethyl, haloxypyr-p-methyl, cinidon-ethyl, flumiclorac-pentyl, flumipropyn, fluthiacet-methyl, pyridate, clopyralid, bispyribac-sodium, KIH-8555, KUH-920, flumetsulam, metosulam, amidosulfuron, azimsulfuron, bensulfuron-methyl, chlorimuron-ethyl, chlorsulfuron, cinosulfuron, cyclosulfamuron,
- 30 ethoxysulfuron, flazasulfuron, galosulfuron-methyl, HOE-107925, imazosulfuron, metsulfuron-methyl, nicosulfuron, primisulfuron, prosulfuron, pyrazosulfuron-ethyl, rimsulfuron, thifensulfuron-methyl, triasulfuron, tribenuron-methyl, atrazine, cyanazine, terbutylazin, benazolin, benfuresate, cafenstrole, cinmethylin, ammonium-bentazone,
- 40 cloquintocet, ET-751, F-8426, KPP-314.

- 45 6. A herbicidal mixture as claimed in any of claims 1 to 5, comprising at least one herbicidal compound (b) from the group consisting of

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2,4-D, MCPA, dichlorprop-p, mecoprop-p, dicamba, bentazone, diflufenican, sulcotrione, quinclorac, caloxydim, cycloxydim, sethoxydim, 2-{1-[2-(4-chlorophenoxy)propyloxyimino]butyl}-3-hydroxy-5-(2H-tetrahydrothiopyran-3-yl)-2-cyclohexen-1-one, acifluorfen-sodium, fluoroglycofen-ethyl, bromoxynil, fenoxypop-ethyl, cinidon-ethyl, amidosulfuron, bensulfuron-methyl, metsulfuron-methyl, nicosulfuron, pyrazosulfuron-ethyl, rimsulfuron, triasulfuron, tribenuron-methyl, atrazine, terbutylazine, ammonium-bentazone, cloquintocet.

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7. A herbicidal mixture as claimed in any of claims 1 to 6, comprising a sulfonylurea (a) of the formula I and one or more herbicidal compounds (b) in a weight ratio of 1:0.1 to 1:40.

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8. A herbicidal mixture as claimed in claim 7, comprising a sulfonylurea (a) of the formula I and one or more herbicidal compounds (b) in a weight ratio of 1:0.2 to 1:20.

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9. A herbicidal composition comprising a herbicidally active amount of a sulfonylurea (a) of the formula I as claimed in any of claims 1 to 4, a synergistically active amount of at least one herbicidal compound (b) as claimed in any of claims 1, 5 or 6, at least one liquid and/or solid carrier and, if desired, at least one adjuvant.

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10. A herbicidal composition as claimed in claim 9, which comprises the sulfonylurea (a) of the formula I and one or more herbicidal compounds (b) in a weight ratio of 1:0.1 to 1:40.

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11. A herbicidal composition as claimed in claim 9 or 10, which comprises the sulfonylurea (a) of the formula I and one or more herbicidal compounds (b) in a weight ratio of 1:0.2 to 1:20.

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12. A method of controlling undesirable vegetation, which comprises applying a sulfonylurea (a) of the formula I as set forth in any of claims 1 to 4 and one or more herbicidal compounds (b) as set forth in claim 1 before, during and/or after the emergence of undesirable plants, either simultaneously or in succession.

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13. A method of controlling undesirable vegetation, which comprises treating the leaves of the crop plants and of the undesirable plants with a sulfonylurea (a) of the formula I as set forth in any of claims 1 to 4 and one or more com-

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pounds (b) as set forth in claim 1, either simultaneously or in succession.

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